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Agriculture

Forest  
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Arizona Zone  
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File Code: 3400

Date: December 28, 1999

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**Subject:** Functional Assistance to the Peaks Ranger District, Coconino National Forest  
Concerning Spruce and Fir Blowdown at Snowbowl Ski Area and Adjacent  
Kachina Peaks Wilderness

**To:** Gene Waldrip

Mary Lou Fairweather, Pathologist, Southwestern Region, Arizona Zone, and I spent parts of two days viewing blowdown spruce and fir caused by a severe wind storm in mid October. On November 12 we viewed some of the blowdown in the Kachina Peaks Wilderness visible from the Humphrey's trail. The next week, November 17, we met with Steve Jenner and Alvin Brown, Peaks Ranger District, to examine the situation within the Snowbowl Ski area. This letter documents these visits, describes potential concerns, and suggests future monitoring actions.

During our visit November 12 we found scattered blowdown along the Humphreys Trail. Much of the blowdown consists of relatively large diameter spruce and corkbark fir trees some of which fell singly while in a few cases there were concentrations of blowdown. Many still have intact root balls while others were broken or snapped off higher on the bole. We are not aware of any estimates on how many trees or how much area was affected within the wilderness. The situation at the ski area that we viewed on November 17 was much more dramatic. Numerous trees were broken and blown down, in some places trees were stacked several layers deep. Some of the hardest hit areas were recently created islands of trees located within ski runs. As in the wilderness many of these trees still have intact root balls. We understand that approximately 30 acres was severely affected by the storm within the ski area.

The main concern presented by this event is the possibility that it may initiate a spruce beetle, *Dendroctonus rufipennis*, outbreak on the peaks. Blowdown, or human created spruce debris is the preferred host material for this insect during endemic or low population levels. In some cases beetles will build up in this material and move into standing spruce. While not every windthrow event results in a spruce beetle outbreak, nearly all known spruce beetle epidemics have resulted from windthrow or human created spruce debris such as logging debris, right of way clearing etc.

Spruce beetle is the most significant natural mortality agent affecting mature spruce. During outbreaks extensive mortality can result over wide areas. Susceptible trees are typically large diameter spruce trees, greater than 16 inches in diameter, however trees as small as 6-8 inches in diameter can be attacked. Susceptible stands are those on high sites, with average diameters greater than 16 inches, predominance of spruce in the canopy, and high densities (greater than 150 square feet of basal area). Outbreaks can result in dramatic changes to stand structures, densities, size classes, and species composition. In susceptible landscapes large outbreaks have resulted in almost complete mortality to mature spruce.



Spruce beetles typically complete their life cycle in 2 years but 1 year and 3 year life cycles are also known. Adults emerge anytime from May through October depending on temperature. Beetles attack hosts soon after emergence. Females attack first followed by males. Adult beetles bore through the outer bark of their host and create tunnels, called egg galleries, in which they lay their eggs. Following egg hatch larvae also feed under the bark. The first winter is spent predominately as larvae. These larvae pupate about one year from attack. Second winter is typically spent as new adults. These adults then emerge the following summer. This two year life cycle is significant in that it allows a little more time for managers to react if needed.

Windthrown spruce can remain viable for attack for up to two years. Many factors are thought to affect duration of suitability. Portions of trees that have been broken off are more likely to desiccate sooner. Trees with intact rootballs maintain some root contact with the soil and can remain green for some time. Trees that have fallen and are shaded by the canopy of other trees are excellent habitat for spruce beetle. Those that fall in a more open condition will desiccate quicker and the exposed portions of the boles are often attacked by other less aggressive bark beetle species which are rarely a concern. In the case of the blowdown on the peaks there were a number of trees in the wilderness that fell with rootballs intact as well as into shaded locations. In the Snowbowl ski area there was quite a mix but there was certainly plenty of suitable hosts present that could serve to initiate an outbreak.

In discussions with Alvin and Steve while at Snowbowl we discussed a number of options for what to do next. I inquired if there were plans to remove any more of the windthrown material. Steve and Alvin indicated that removing more material will not be feasible at this time. However, quite a bit of material has already been removed, including all the trees that fell onto the ski runs. A significant amount remains off the runs. Because of the steep slopes on the mountain there are concerns about removing any more of the broken and windthrown trees. I offered that we could conduct a survey of the area within the Snowbowl late next summer, following spruce beetle flight. At that time we could get a better idea of how much of a threat the insect may pose in the future. If at that time we find large numbers of beetles invading the windthrown material we could consider whether or not further actions might be needed. I would suggest monitoring both next year and the following year. Funds may also be available from Forest Health Protection to deal with a potential outbreak situation if needed. As an aside, we commend Steve for his actions in reducing the risk of future tree failure on the ski lift and its riders. The wind storm created a new set of potential hazard trees along the lift, removal of these obvious hazards was prudent.

If you have any questions feel free to contact me at 556-2074 or via email at [jwilson/r3,coconino](mailto:jwilson/r3,coconino).

/s/ Jill L. Wilson

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